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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,878	12/13/2005	Zhen-Yu Yang	CL2203USPCT	2511
23906 7590 03/12/2010 E I DU PONT DE NEMOURS AND COMPANY LEGAL PATENT RECORDS CENTER BARLEY MILL PLAZA 25/1122B 4417 LANCASTER PIKE WILMINGTON, DE 19805			EXAMINER HU, HENRY S	
			ART UNIT 1796	PAPER NUMBER
			NOTIFICATION DATE 03/12/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-Legal.PRC@usa.dupont.com

Office Action Summary	Application No. 10/560,878	Applicant(s) YANG, ZHEN-YU	
	Examiner HENRY S. HU	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendment of October 29, 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19,31,32,34-36,48,49 and 59-62 is/are pending in the application.
- 4a) Of the above claim(s) 5-19,31,32,34-36,48 and 49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 59-62 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-19,31,32,34-36,48,49 and 59-62 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input checked="" type="checkbox"/> Other: <u>Library search report # 321658</u> |

1. USPTO has received **Amendment** filed on October 29, 2009, which is in response to Non-Final office action filed on May 29, 2009. With such an amendment, **Claim 1 is amended; non-elected Claims 5-8 (Group II), Claims 9-17 (Group III) and Claims 18-19, 31-32, 34-36 and 48-49 (Group IV) are still withdrawn, Claims 20-30, 33, 37-47 and 50-58 are previously cancelled, new Claims 59-62 are added, while no claim is currently cancelled or added.** To be specific, parent **Claim 1** is amended on the chemical formula (1) so as **to have $-(R_F-SO_2-F)_n$ located on the *para* position of $-CF=CF_2$.** Newly added parent **Claim 60** related to original parent Claim 1 **but with the bivalent R_F being $-O-CF_2-CF_2-$.** Certainly, the scope of parent claim is changed from previous one.

Two IDS' (2 pages each) are received. Examiner **accepts Applicants' two drawing sheets with Figures 1-2** file along with this application (brief description is on page 10). **Claims 1-19, 31-32, 34-36, 48-49 and 59-62 with eight independent claims (Claims 1, 5, 9, 18, 31, 32, 48 and 60) are now pending,** while all non-elected Claims 5-8 (Group II), Claims 9-17 (Group III) and Claims 18-19, 31-32, 34-36 and 48-49 (Group IV) are all withdrawn from consideration. An action follows.

DETAILED ACTION

Response to Argument

2. Applicant's arguments filed on October 29, 2009 have been fully considered but they are not persuasive. The focal arguments related to the patentability will be addressed as follows:

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Two independent claims (Claim 1 and Claim 60) are now involved. The amendment on parent **Claim 1** is only to change the chemical formula (1) so as to have $-(R_F-SO_2-F)_n$ located on the *para* position of $-CF=CF_2$, while new parent **Claim 60** relates to the monomer of original parent Claim 1 but with the bivalent R_F being $-O-CF_2-CF_2-$. Certainly, the scope of parent claim is changed from previous one.

After further search and consideration, previous 102(b) rejections are now modified to new 103(a) rejections with new references. **Final office action is thereby applied.** An action follows.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

On **Claim 1**, the formula 1 with $-(R_FSO_2F)_n$ located on the carbon atom at *para* position of trifluorovinyl benzene may cause indefiniteness. **When n is 2**, there are two $-R_FSO_2F$

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groups on the same carbon atom. **The aromatic trifluorovinyl compound will not be existed since the involved carbon atom will have five bonds.** Rewriting with clarification is needed.

Claim Rejections - 35 USC § 103

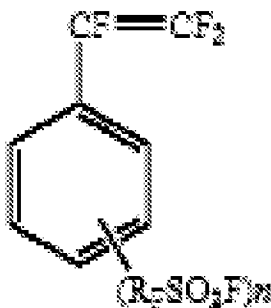
4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. The limitation of “**once-amended**” parent **Claim 1** in present invention relates to a monomer having the following structure:



Note: The amendment on parent **Claim 1** is only to change the chemical formula (1) so as to have $-(\text{R}_F\text{-SO}_2\text{-F})_n$ located on the *para* position of $-\text{CF}=\text{CF}_2$

wherein R_F is linear or branched perfluoroalkene group, optionally containing oxygen or chlorine; and n is 1 or 2.

New parent **Claim 60** relates to the monomer of original parent Claim 1 but with the bivalent R_F being $-\text{O}-\text{CF}_2-\text{CF}_2-$. See other limitations of dependent **Claims 2-4, 59 and 61-62**.

6. **Claims 60-61 are rejected** under 35 U.S.C. 103(a) as being unpatentable over **Doyle et al.** (WO 99/67304) in view of a combination of two references including **Barnett et al.** (US 4,506,035) and **Stone et al.** (US 6,359,019 B1).

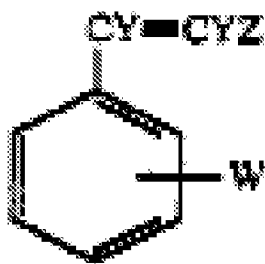
Regarding the “**trifluorostyrene type monomer having the specific structure** $\text{CF}_2=\text{CF}-\text{C}_6\text{H}_4-(\text{R}_\text{F}-\text{SO}_2-\text{F})_\text{n}$ ”, new parent **Claim 60** relates to the monomer of original parent Claim 1 but with the bivalent R_F being $-\text{O}-\text{CF}_2-\text{CF}_2-$, while $-(\text{R}_\text{F}-\text{SO}_2-\text{F})_\text{n}$ can be in any position on the aromatic ring. R_F in Claim 1 is a bivalent linear or branched perfluoroalkene group, optionally containing oxygen or chlorine; and n is 1 or 2. In a very close examination, the scope of new parent **Claim 60** will include the specified monomer with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *meta* or *para* position to the $-\text{CF}=\text{CF}_2$.

7. **Doyle et al.** have already prepared two monomer or monomer's precursors with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *meta* or *para* position to the $-\text{CH}=\text{CH}_2$. See pages 7-11; particularly see Formula (V) on page 7 and **Formula (VIII)** on page 8. The incorporation of $-\text{CH}=\text{CH}_2$ by synthetic method into aromatic ring is disclosed on page 11. Doyle is thereby silent about **two** things including: (A) preparing the specified monomer with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *meta* or *para* position to the $-\text{CF}=\text{CF}_2$, and (B) the motivation to do so. **Two** references including **Barnett and Stone in combination** can teach and/or suggest such two subject matters at the same time.

8. **Barnett has indeed taught the chemical architecture** by preparing some polymerizable aromatic vinyl monomers with general formula (V) as below, wherein Y is hydrogen or fluorine, Z is hydrogen, fluorine or chlorine; W is hydrogen, C_{1-6} alkyl, C_{2-6} alkenyl, halogenated C_{1-6} alkyl, or halogenated C_{2-6} alkenyl. See column 2, line 59 – column 3, line 4. Barnett has

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disclosed that $-\text{CH}=\text{CH}_2$ and $-\text{CF}=\text{CF}_2$ are functionally equivalent and interchangeable
while the W group can be electron-donating or electron withdrawn.



9. Stone et al. have prepared some polymerizable aromatic trifluorovinyl ($-\text{CF}=\text{CF}_2$) monomers with general formula (I) as below, wherein **A group also can be electron-donating (such as OR, SR or NRR')** or **electron-withdrawing (such as $-\text{SO}_2\text{-F}$)**. See column 2, line 29-61. By doing so, the advantage the sulfonyl-containing polymer can be effectively useful in the ion-exchange membrane particularly in fuel cell area. See column 1, line 9-13.



10. In light of the fact that all involving references are dealing with making polymerizable aromatic vinyl monomers and they are for the same or at least similar electrolyte applications, one having ordinary skill in the art would therefore have found it obvious to modify Doyle's process of making polymerizable aromatic vinyl monomers by synthetic efforts so as to prepare

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some “specified monomer with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *meta* or *para* position to the $-\text{CF}=\text{CF}_2$ ” as taught by a combination of **Barnett and Stone**. By doing so, better performances in the ion-exchange membrane particularly in fuel cell area may be effectively achieved. Therefore, more diversified and better electrolyte product may be obtained.

11. Remaining dependent **Claims 61 and 62** can be rejected with the same rationale as discussed above.

12. **Claims 1-4 and 59 are rejected** under 35 U.S.C. 103(a) as being unpatentable over **Doyle et al.** (WO 99/67304) in view of a combination of two references including **Barnett et al.** (US 4,506,035) and **Stone et al.** (US 6,359,019 B1).

Regarding the “**trifluorostyrene type monomer having the specific structure $\text{CF}_2=\text{CF}-\text{C}_6\text{H}_4-(\text{R}_\text{F}-\text{SO}_2-\text{F})_n$ with n being 1 or 2**”, the amendment on parent **Claim 1** is only to change the chemical formula (1) so as to have “the first” $-(\text{R}_\text{F}-\text{SO}_2-\text{F})$ located on the *para* position of $-\text{CF}=\text{CF}_2$, R_F in Claim 1 is a bivalent linear or branched perfluoroalkene group, optionally containing oxygen or chlorine; and n is 1 or 2. As discussed in the 112-2nd claim rejection, the amended chemical formula 1 is improper. Rewriting with clarification is needed.

13. According to the bivalent “ R_F ” limitation of its dependent three claims including **Claim 2, Claim 3 and Claim 59**, the scope of parent **Claim 1** will certainly include the specified

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monomer with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *para* position to the $-\text{CF}=\text{CF}_2$.

To be specific, in the case of R_F being $-(\text{CF}_2\text{CF}_2)_r-\text{O}-\text{CF}_2\text{CF}_2-$ and wherein $r = 0$ to 6, the

involved R_F will become $-\text{O}-\text{CF}_2\text{CF}_2-$ when n is 0. **The same issue as in the case for parent**

Claim 60 is involved now.

14. In summary, **Doyle** is thereby silent about **two** things including: (A) preparing the specified monomer **with the $-\text{OCF}_2\text{CF}_2-\text{SO}_2-\text{F}$ (when n being 1) on the *meta* or *para* position to the $-\text{CF}=\text{CF}_2$** , and (B) the motivation to do so. **Two** references including **Barnett and Stone in combination** can teach and/or suggest such two subject matters at the same time. Accordingly, **exactly the same rationale used to reject Claims 60-62 can be used to reject Claims 1-4 and 59.**

15. Remaining dependent **Claims 2-4 and 59** can be rejected with the same rationale as discussed above.

16. In summary, after further search and consideration, previous 102(b) rejections are now modified to new 103(a) rejections with new references. **Final office action is thereby applied.** Further amendments on **two** parent claims including **Claim 1 and Claim 60** are suggested.

Conclusion

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17. Applicant's amendment **necessitated the new ground(s) of rejection presented in this**

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Vasu Jagannathan, can be reached on (571) 272-1119. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application. Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Peter D. Mulcahy/
Primary Examiner, Art Unit 1796

/Henry S. Hu/
Examiner, Art Unit 1796

March 8, 2010